WHAT IS CLAIMED IS:

1.   A method for communicating a packet in a communications network comprising a cell relay satellite, said method comprising the steps of:

    dividing the packet into segments at a source in the communications network;

    generating a cell for each of the segments, wherein each cell includes a first portion and a second portion with a prefix, a downlink beam locator, and a source identifier included in the first portion;

    inserting each of the segments into the second portion of each of the generated cells, respectively; and

    transmitting the generated cells to the cell relay satellite.

2.   The method of claim 1, wherein said generating step further comprises the step of:

    including a suffix in each first portion of the generated cells.

3.   The method of claim 1, wherein said generating step further comprises the step of:

    identifying a destination in the communications network corresponding to the downlink beam locator.

4.   The method of claim 1, wherein said dividing step further comprises the step of:

    prepending a header portion to the packet;

    appending a trailer portion to the packet; and

    inserting a null padding portion between the trailer and the packet so that a combined length of the packet, the header portion, the trailer portion, and the null padding portion equals to an integer multiple of the length of the second portion of each of the generated cells.

5.   A method for communicating a packet in a first communications network comprising a cell relay satellite, said method comprising the steps of:

receiving, at a first destination in the first communications network, a plurality of cells each comprising:

a first portion including a prefix, a downlink beam locator, and a source identifier; and

a second portion including a segment of a packet; and

re-assembling the packet from the segments in the second portion of the received cells.

6.   The method of claim 5, wherein said re-assembling step further comprises the steps of:

identifying the cells corresponding to the packet;

appending the segments together in order of receipt of the identified cells.

7.   The method of claim 5 further comprising the steps of:

identifying in the packet an address of a second destination in a second communications network interfacing the first destination; and

routing the packet to the identified second destination in the second communications network.

8.   A satellite earth station for communicating a packet without establishing a connection in a communications network comprising a cell relay satellite, said system comprising:

a memory comprising a packet converter program for segmenting the packet into a number of segments, and for generating a cell for each of the segments, wherein each cell includes a first portion and a second portion, and for including a prefix, a downlink beam locator, and a node identifier in the first portion of each generated cell, and for inserting each of the segments into the second portion of the generated cells, respectively;

a processor for running the packet converter program; and

a transmitter for transmitting the generated cells to the cell relay satellite.

15

9.   A satellite earth station for communicating a packet without establishing a connection in a communications network comprising a cell relay satellite, said system comprising:

a receiver for receiving a plurality of cells each comprising:

a first portion including a prefix, a downlink beam locator, and a node identifier; and

a second portion including a segment of a packet;

a memory comprising a packet re-assembler program for re-assembling the packet from the segments in the second portion of the received cells; and

a processor for running the packet re-assembler program.

10.   A computer-readable medium capable of configuring a satellite earth station to perform a method for communicating a packet without establishing a connection in a communications network comprising a cell relay satellite, said method comprising the steps of:

dividing the packet into segments at a source in the communications network;

generating a cell for each of the segments, wherein each cell includes a first portion and a second portion with a prefix, a downlink beam locator, and a source identifier included in the first portion;

inserting each of the segments into the second portion of each of the generated cells, respectively; and

transmitting the generated cells to the cell relay satellite.

11.   A computer-readable medium capable of configuring a satellite earth station to perform a method for communicating a packet without establishing a connection in a communications network comprising a cell relay satellite, said method comprising the steps of:

receiving, at a first destination in the first communications network, a plurality of cells each comprising:

a first portion including a prefix, a downlink beam locator, and a source identifier; and

16

a second portion including a segment of a packet; and

re-assembling the packet from the segments in the second portion of the received cells.

12. The computer-readable medium of claim 11, wherein said re-assembling step further comprises the steps of:

identifying the cells corresponding to the packet; and

appending the segments together in order of receipt of the cells.

13. A method for communicating a packet in a communications network comprising a cell relay satellite, said method comprising the steps of:

dividing the packet into segments at a source in the communications network;

generating a cell for each of the segments, wherein each cell includes a first portion and a second portion with a prefix, a downlink beam locator, and a source identifier included in the first portion;

inserting each of the segments into the second portion of each of the generated cells, respectively;

transmitting the generated cells to the cell relay satellite;

receiving the transmitted cells at a destination in the communications network; and

re-assembling the packet from the segments in the second portion of the received cells.